

We claim:

1 1. A laser device for generating laser pulses with an optically pumped
2 semiconductor laser (1), comprising:
3 an external resonator, and
4 at least one mode-locker (10).

1 2. The laser device as claimed in claim 1,
2 wherein
3 the semiconductor laser (1) is optically pumped by means of a pump radiation
4 source (3) arranged externally.

1 3. The laser device as claimed in claim 1,
2 wherein
3 the semiconductor laser (1) is optically pumped by means of a pump radiation
4 source (3a, 3b) which is monolithically integrated into the semiconductor laser (1).

1 4. The laser device as claimed in claim 1,
2 wherein
3 the mode-locker (10) is a passive mode-locker.

1 5. The laser device as claimed in claim 4,
2 wherein

3 the mode-locker (10) is a saturable absorber.

1 6. The laser device as claimed in claim 5,

2 wherein

3 the mode-locker is a saturable absorber made of a semiconductor material.

1 7. The laser device as claimed in claim 1,

2 wherein

3 the mode-locker (10) is monolithically integrated into the semiconductor laser (1).

1 8. The laser device as claimed in claim 1,

2 wherein

3 the mode-locker (10) is combined with a resonator mirror (9).

1 9. The laser device as claimed in claim 1,

2 wherein

3 the resonator has a device for phase compensation.

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1 10. The laser device as claimed in claim 1,

2 wherein

3 a device for phase compensation is arranged downstream of the resonator.

1 11. The laser device as claimed in claim 9,
2 wherein
3 the device for phase compensation has at least one prism (14, 15, 16, 17), a
4 grating, a linear or chirped mirror (19), a lens and/or an optical fiber.

1 12. The laser device as claimed in claim 11,
2 wherein
3 the resonator has a chirped folding mirror (19).

1 13. The laser device as claimed in claim 1,
2 wherein
3 the resonator has a first resonator branch for generating laser pulses having a
4 fundamental wavelength λ_1 and a second resonator branch for generating laser pulses
5 having a fundamental wavelength λ_2 .

1 14. The laser device as claimed in claim 13,
2 wherein
3 the laser pulses having the fundamental wavelength λ_1 and the laser pulses having the
4 fundamental wavelength λ_1 are coupled to one another in a phase-locked manner.

1 15. The laser device as claimed in claim 1,
2 wherein

3 the laser pulses have a pulse duration which is less than 100 ps, preferably less
4 than 20 ps, particularly preferably less than 1 ps.

1 16. The laser device as claimed in claim 1,
2 wherein
3 the laser device is a laser oscillator.

1 17. The laser device as claimed in claim 1,
2 wherein
3 the laser device is a laser amplifier.

1 18. The laser device as claimed in claim 17,
2 wherein
3 the laser amplifier is a CPA amplifier.

1 19. The laser device as claimed in claim 1, wherein said mode-locker is
2 arranged in said external resonator.

1 20. The laser device as claimed in claim 1, wherein a portion of the mode-locker
2 is arranged internally and part is arranged externally of the semiconductor laser.